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# Flying Saucers Again:

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## Do You Believe in Them?

By CHARLES COOKE

The Unbelievers implacably don't believe—and the Believers implacably do believe—in the existence, or "reality," of certain famous movable bodies—namely the alluringly mysterious Unidentified Flying Objects, or UFOs, popularly called Flying Saucers. These things (if you are a Believer) or non-things (if you are an Unbeliever) have in recent years been reported in such waves, indeed blizzards, world-wide, that the Air Force's Project Blue Book, charged with the responsibility of recording, evaluating, and reporting on them to the public, has, to date, studied and explained (or left unexplained) over 10,000 reported sightings.

That statistic alone would seem to indicate that *something* is going on up there, would it not? (I'm

Charles Cooke, a retired Lieutenant Colonel in the U.S. Air Force, was the founder and first editor of the Air Force's official intelligence publication, the "Air Intelligence Digest," published at the Pentagon, and later editor of the Far East Air Force's "FEAF Intelligence Roundup," published in Tokyo.

going to do my best to be objective in this article, and not fall into what lawyers call special pleading, despite my own orientation in the controversy.)

I'm a Believer.

I was not persuaded, or shoved, into this position by any of the books listed with this article, convincing though they (with the exception of the last one in the list) are. My belief began in 1948 and has grown steadily, until today it is, as befits the faith of a True Believer, implacable.

In this article I am merely going to state my qualifications for writing it; review the listed books briefly from a certain special angle; then bring in some background material which has not, to my knowledge, been discussed very often in print before.

This background material was dug up by me as a labor of insatiable curiosity rather than of love, most of it during long treasure hunts in the enormous archives of old magazine and newspaper issues at the Library of Congress. The ever-obliging Library photostatted the nuggets I found, and they are in my files.

### Writer's Qualifications

In World War II, I was an intelligence officer serving first in England and then on the Continent with a bombardment group of the old B-26s, or "Martin Marauders". Discharged in 1946, I returned in 1948 to active duty at the Pentagon as the founder and first editor of the "Air Intelligence Digest," the official intelligence publication of the world-wide Air Force. Later, in Tokyo, I became editor of the Far East Air Force's parallel publication, the "FEAF Intelligence Roundup."

The contents of these publications were classified, but their names were not. Not immodestly, but as part of my statement of qualifications, I mention that I received an official commendation for my work as editor of the Pentagon "Digest" from Gen. Charles P. Cabell, Director of Intelligence, U. S. Air Force, and later, for years, Vice Chief of the Central Intelligence Agency; and a Bronze Star citation for my work as editor of the Tokyo "Roundup" from Gen. Don Z. Zimmerman, Deputy for Intelligence, Far East Air Force.

From 1948 to 1952 at the Pentagon, and from 1952 to 1955 in Tokyo, my desk was one of several across which flowed "information copies" of the steadily increasing stream of UFO sightings then being reported to the Air Force.

### Project Blue Book

The responsibility for evaluating these reports, then and now, has belonged to a USAF unit located at the Wright-Patterson Air Base in Dayton, Ohio, whither Air Force business often took me. The unit was first called Project Sign, then Project Grudge, finally (and to this day) Project Blue Book.

Project Blue Book is mentioned everywhere you look nowadays, and I have found myself telling people: "I named it Project Blue Book." People, raising their eyebrows to varying levels of incredulity, reply: "Did you?" I reply: "I did." Sometimes I explain, sometimes I don't. The explanation is that the Pentagon, becoming understandably disenchanted with Project Grudge as a code name, asked in 1952 for suggestions for a new name, one "without overtones."

I, as editor of the "Air Intelligence Digest," suggested Project Blue Book, on the ground that, being, perhaps—that book—has so many overtones that it has, in effect, none. "Book" was well re-

ceived, but got expanded "Upstairs"—at Joint Chiefs of Staff level—to "blue book."

The code name Project Blue Book was thus born—and you have just read the whole truth about my modest participation. I was only its half-father.

Despite the fact that I had no UFO responsibilities, no one, in the USAF assembly line down which the reports passed, read and pondered them more absorbedly, more dedicatedly, than I.

### Three Aspects

I was especially interested in three aspects...

One: I duly noted the myriad "Explanations" given out by the Blue Book staff—widely referred to as "The Little Boy Blues" or "The Little Blue Boys"—of sightings which they evaluated as mistakenly identified stars, planets, comets, meteors, ionized clouds, airplanes, helicopters, balloons, auroral streamers, birds, reflected lights, mirages, marsh gas—or as "illusions, delusions, hallucinations, psychic aberrations, hoaxes, publicity stunts, gags, pranks, etc."

Two: I noted that the hard core of "unexplained" sightings fluctuated from as high as 7 percent to as low as 2 percent—but, significantly, never lower.

Three: I noted that the date of "the first reported UFO sighting" was given—and still is—seemingly thousands of times—in the press and even in some official reports—as June 24, 1947, the date of the famous "Arnold sighting".

On that date, Kenneth Arnold, a private pilot flying from Chehalis to Yakima in the state of Washington, reported seeing "nine saucer-like things... flying like geese in a diagonal, chain-like line and approaching Mt. Rainier." They "swerved in and out of the high peaks," according to Arnold, at a speed he estimated to be 1,200 miles an hour.

*The Sunday Star*

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## A Persistent Date

It is amazing how June 24, 1947, has remained stuck like a burr in the public mind as the hallowed UFO Natal Day.

Time magazine, in its March 3, 1952, issue, wrote: "The first ones reported [were] sighted near Mt. Rainier in 1947."

Life magazine, in its April 7, 1952, issue, wrote: "The shapes and the inscrutable portents of the flying disks first broke upon the skies of the world in 1947."

Although what is now the United States military establishment dates back to several years before there was a United States, our military record-keepers did not start keeping tabs on UFO reports until, precisely, the year 1947. (See the statistical table on page 82 of "Flying Saucers and the U.S. Air Force: The Official Air Force Story," published in 1960, and note also the following flat statement on page 12 of the same book: "For all practical purposes, and for the purpose of this book, Air Force History relating to unidentified flying objects or flying saucers began on Tuesday, June 24, 1947.")

In his startling new book, "Incident At Exeter," John G. Fuller, staff writer of the column, "Trade Winds," in the Saturday Review of Literature, refers to "the twenty-year history of the phenomenon's most yeasty occurrences."

And so it has gone and still goes . . . 1947 . . . 1947 . . . 1947 . . .

## Recommended Reading

Believers and Unbelievers alike, I think, should read Fuller's book, which reports, with depth of detail equal to that in Capote's "In Cold Blood," the September 3, 1965, sighting at Exeter, N. H., reported by a young man, Norman Muscarello, and two officers, Eugene Bertrand and David Hunt, of the Exeter police force. Mr. Fuller, microscopically studying this and other recent reported sightings in the area, interviewed some 60 down-to-earth, plain-spoken New Englanders, recording their every word on 20 hours of tape.

Having been in beautiful Exeter many times when my son was in school there, I felt a special immediacy about the whole book.

I am unable to judge the validity of Fuller's strongly held and elaborately developed thesis that UFOs, attracted to, and given to following, power lines, caused the Great Northeast Blackout a few months ago. How about judging that aspect of the book for yourselves?

I said I wouldn't try to proselytize, but—here I address the Unbelievers—would you read Fuller's book? Well, would you start it? (If you do, I think you will finish it.)

While at it, would you consider reading Frank Edwards' equally new, equally detailed "Flying Saucers—Serious Business"?

And then why not get hold of "The UFO Evidence," a massive 200,000-word document published in 1964 by NICAP (The National Investigations Committee On Aerial Phenomena) whose headquarters are in Washington, D.C.? I'm only suggesting!

## The UFO War

You won't find any of this reading dull. Take, for one thing, the grimness of the war being waged between these passionate authors and the hard-pressed United States Air Force. A few blistering quotes will indicate how, in this controversy, each side regards the other as the Devil's Advocate:

FULLER: "The Air Force has, in a very subtle manner, gone out of its way to insult hundreds, and perhaps thousands, of respectable citizens . . . pooh-pooing the serious reports of dozens of qualified pilots . . . playing dirty pool in relation to the citizenry. The UFO's greatest enemy is the U.S. Air Force. . . . We are back again to NICAP's contention that the Air Force is, in the most simple and direct terms, lying. By the same token, of course, the Air Force is calling NICAP a liar."

EDWARDS: "In August of 1965, when tens of thousands of persons from the Dakotas to Mexico watched peculiar lighted formations hovering and maneuvering in the skies, the Air Force blandly informed the news services that all these witnesses, on the ground and in the air, had been watching nothing more unusual than four stars in the constellation Orion!"

NICAP: "The U.S. Air Force is charged with the official investigation of UFOs, but has practiced an intolerable degree of secrecy, keeping the public in the dark about the amount and possible significance of UFO evidence."

U.S. AIR FORCE: "I [Lt. Col. Lawrence J. Tacker] state emphatically that the United States Air Force is not withholding information on this subject from the general public."

## Pre-1947 Reports

Far from having begun in 1947, reported UFO sightings go way, way back.

They go back well over a century, as can be proven by the record. And they go back even to Biblical times, in some examples where the connection, although titillating when you get to pondering it, can only be speculative.

Time and Readers Digest have printed articles purportedly covering Pre-1947, but Time mentioned only the celebrated "airship" reportedly seen by thousands of Americans from Oakland, Cal., to Chicago, in 1896-97—and Readers Digest reported only on sightings in 1913, 1904, 1897 (the same one mentioned by Time), 1882, and 1870. These references barely scratched the surface.

In the books under discussion in this article, the one by the Air Force disposes of Pre-1947 in 22 lines at the beginning of Chapter 2, "The History of the 'Saucers'."

Even the NICAP book, magnificently detailed in the Post-1947 reports listed in its Section XI, "The UFO Chronology," gives only a column and a half to Pre-1947, under the headings of "19th Century," "Early 20th Century," and "World War II 'Foo Fighter' Era."

Fuller's book doesn't touch on Pre-1947. I think he was well advised to omit this complex quadrant entirely. His hands and his mind and his tape recorder were busy enough with the investigations in depth of New England 1965 and 1966 reports which he resourcefully initiated, doggedly carried out, and brilliantly chronicled.

Edwards' book, however, gave me great joy in its attention to Pre-1947.

Following a forthright statement, that "As a professional reporter, I am well aware of the importance of including . . . the very beginning of the story," he touches on, among other things, the rather well-known Biblical "references" and also brings in an extraordinary extract from the archaic "Book of Dzyan—A Chronicle of Ancient India" which, for all my spading in the field of Pre-1947, I had never heard of.

The Biblical "references" are, of course, to a "wheel in the middle of a wheel" in the "whirlwind [that] came out of the north" (Ezekiel)—taken by some students to mean a flying disk—and, in Zechariah, "Then I lifted up mine eyes and looked and beheld a flying roll . . . the length thereof twenty cubits and the breadth ten cubits"—30 by 15 feet in our terms.

nology—and equated by some to the familiar cigar-shaped objects described in thousands of modern reports.

If you have read thus far, please don't stop because of these references to "references" which, although unquestionably interesting, are dubious at best.

What follows is not legendary.

#### January 12, 1838

The earliest apparently firm Pre-1947 report turned up by my researches was made on January 12, 1838, and was referred to briefly in the 1877 "Report of the British Association for the Advancement of Science": "... a report that at Cherbourg, France, on 12 January 1838, was seen a luminous body, seemingly two-thirds the size of the moon. It seemed to rotate on an axis. Central to it there seemed to be a dark cavity."

The similarity of this earliest dated UFO report to many modern reported sightings is apparent.

#### Nature: 1880, 1893

The British magazine *Nature*, highly respected by the international scientific community, reported an unusually interesting sighting in its May 20, 1880, issue. The item on "a remarkable phenomenon observed at Kattenau, near Trakehnen (Germany)" described "an enormous number of luminous bodies" which "rose from the horizon and passed in a horizontal direction from east to west. They moved through space like a string of beads, and shone with a remarkably brilliant light."

In the May 25, 1893, issue of *Nature* appeared the tantalizing report on what students of UFO history call "The unknown lights of Japan." The article stated that "these globes altered in their formation . . . and . . . took the form of a crescent or diamond, or hung, festoon-like, in a curved line."

#### 'Soul-Shaking Experiences'

M. Lincoln Schuster, of the publishing firm of Simon & Schuster, wrote, in his introduction to a book entitled "A Treasury of the World's Great Letters": "When any person has a soul-shaking experience, he usually can—and frequently does—write a letter about it."

A large percentage of the most amazing of the early reports were contained in startled and puzzled letters to such sober and reputable journals as the *London Times*; *Scientific American*; *Nature*; *American Meteorological Journal*; *U.S. and Canada Monthly Weather Review*; *L'Astronomie*; *Astronomische Nachrichten*; *London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science*; *The Observatory—Monthly Review of Astronomy*, and

These letters prove, if they prove nothing else, that the witnesses were deeply moved and excited by what they saw. (There was no Project Blue Book in those days to patiently explain to them that (1) they probably saw nothing and should stop being hysterical, or (2) it was a weather balloon, a mirage, or marsh gas.)

#### London Times: 1848 to 1870

Why 19th Century UFO reports, in all their varied, strange, and sometimes wildly extravagant forms, should have poured in on the ultra-conservative *Times* of London ("The Thunderer") is a mystery as challenging as that of UFOs themselves.

The serious treatment accorded to these reports by the great *Times* is, however, gratifying to look back on, since, in the 1800s, these sightings must have seemed far more incredible than they do in today's age of supersonic flight, atomic fission and fusion, close-up photography of Mars, Venus fly-bys, and instrument landings on the Moon.

Here are some selected quotations from Pre-1947 UFO reports published in the *Times* of London:

1848. "There they shone with a bright flickering light until about 10 o'clock, when they moved, making a slight curve westward. The speed with which they migrated was prodigious."

1859. "... a most extraordinary appearance in the sky this evening . . . has quite frightened the superstitious here. At 7:20, a brilliant red light appeared to the south by east, about half-way between the zenith and horizon . . . its shape was oblong . . . in about 15 minutes it rose to the zenith."

1867. "This (to me) extraordinary object . . . floated steadily away, northwest by north . . . threw no rays in any direction . . . and was in my sight, from first to last, about three minutes."

1869. "A brilliant luminous body sailing slowly across the lake. . . ."

1870. "A falling star would never have remained so long visible in the telescopic field."

#### 'Auroral Beam'

The so-called "Auroral Beam of November 17, 1882," was the subject of a 20-page article in *The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science*. One of the 28 observers of this amazing phenomenon was the Astronomer Royal.

It was described by various observers as "spindle-shaped," "a cigar-ship," "torpedo-like," "a weaver's shuttle," and "a ball of yellowish light, with a dark something before the bar and a dark streak where it passed."

The compiler of the observations, Mr. J. Rand Capron, wrote: "A primary question is whether the beam was truly part of an auroral display, or a 'meteor,' 'meteoroid,' 'cometary body,' or something allied to any of these, in contra-distinction to an 'auroral beam.'"

Commenting on the extraordinary article, *The Observatory—Monthly Review of Astronomy*, spoke of the sighting as "unusual and striking, not to say awe-inspiring."

#### 'That Airship'

Unquestionably, the most famous and most baffling American Pre-1947 UFO report was of the "airship" which, first reported over Oakland, Cal., in November of 1896, finally appeared, according to thousands of observers, including many scientists, over Chicago.

The *Oakland Tribune* of November 23, 1896, led off its goggle-eyed story as follows:

"That a huge airship has been hovering over Oakland for the last few nights has, in the minds of many, been conclusively proven." The dispatch stated further: "The ship resembled a huge bird in its outlines and seemed to rise and fall in its course."

The *New York Herald* printed a dispatch in its April 11, 1897, issue which, headlined "THAT AIRSHIP NOW AT CHICAGO," stated: "For weeks, reports have been coming in from various points between here and California regarding an airship . . . men of unquestioned veracity declare the moving object was an airship . . . some declare they saw two cigar-shaped objects, and great wings. Chicago and her suburbs are intensely interested, and the subject is almost the sole topic of conversation."

The Oakland to Chicago odyssey of "that airship," or whatever it was, is well-known to UFO researchers, but I pause here to call your attention to the remarkable statement sworn to by a Kansas farmer named Hamilton—Alexander Hamilton!—of Leroy, Kan., on April 21, 1897, and attested to ("for truth and veracity we have never heard his word questioned") by neighbors of his including the justice of the peace, the sheriff, the deputy sheriff, the registrar of deeds, and other substantial citizens. Farmer Hamilton's sworn statement appears on pages 20, 21, and 22 of Mr. Edwards' book, "Flying Saucers—Serious Business." He stated that he saw ("to my utter astonishment") that "an airship was slowly descending upon my cow lot . . . until it was not more than 30 feet above the ground, and we came to within 50 yards of it . . . It consisted of a great cigar-shaped portion, possibly 300 feet long, with a carriage underneath. . . . Hamilton reported that the airship "turned a light when it turned on some unknown power" and rose, "slowly disappearing in the north."

Hamilton also reported that there were "hideous people" aboard the airship and that when it departed it took with it one of his heifers, which had been bound with "a cable . . . made of some red material fastened in a slipknot around her neck." I won't attempt to evaluate that part of the statement—it is possible that under the stimulus of the sight of a literally unearthly marvel, both truth and hysteria-induced fiction might have been reported.

But I take full note—and I call to my readers' attention—the facts

that the Oakland Tribune article was dated November 23, 1896; the New York Herald article April 11, 1897; and Farmer Hamilton's statement April 21, 1897.

If these sightings were real, if in truth a "huge airship" of unknown origin and reported high mobility was in our skies, these sequential dates seem to me conclusive proof that Farmer Hamilton, of Leroy, Kan., saw the same unidentified flying object that had been reported over Oakland, Omaha and Chicago.

#### Monthly Weather Review

In, respectively, the March 1904 and July 1907 issues, the U.S. Weather Bureau's Monthly Weather Review printed two of the most mystifying and beguiling UFO reports on record.

The author of the 1904 report ("Remarkable Meteors") was Lt. Frank H. Schofield of the U.S. Navy. He stated that he saw "three somewhat remarkable meteors" at 35 degrees 58 feet North—128 degrees 36 feet West, which "appeared near the horizon and below the clouds, travelling in a group from northwest by north (true) directly toward the ship. . . . As they approached the ship, they appeared to soar. . . ."

(Author's note: To call meteors which travel in a group and soar "somewhat remarkable" was the understatement of the century.)

The 1907 report ("A Possible Case of Ball Lightning") was by William H. Alexander, the official weather forecaster of Burlington, Vt. He wrote about an "explosion so sudden, so unexpected, and so terrific that it startled practically the entire city of Burlington." He quoted Bishop John S. Michaud, who, at the time of the incident, was standing in conversation with ex-Gov. Woodbury of Vermont, at the corner of Church and College Streets. Readers who may already have concluded that the explosion was indeed either just a "possible case of ball lightning," or a bolide (exploding meteor), should note what the weather expert quoted the Bishop as saying. After a reference to "the most unusual and terrific explosion," Bishop Michaud said:

body some 300 feet away, stationary in appearance and suspended in the air about 50 feet above the tops of the buildings. Although stationary when first seen, this object soon began to move, rather slowly . . ."

I can't help wondering out loud what Project Blue Book's "explanation" of this report would have been. Marsh gas?

#### Mongolia: 1927

In his book, "Altai Himalaya," Nicholas Roerich—painter, traveler, and mystic—wrote that in Mongolia in 1927 he and his party saw "something big and shiny reflecting the sun, like a huge oval moving at great speed. Crossing our camp, it changed its direction from south to southwest. We even had time to take out field glasses and saw quite distinctly an oval form."

To Unbelievers who might ask, with a gentle smile, whether Roerich's oval object, sighted in the High Himalayas, was piloted by an Abominable Snowman, this Believer would reply, with a gentle smile: "I wonder. I wonder about the whole thing. And so, I think, do you."

#### Yes or No?

The first basic question is: Has anybody really seen anything? (I believe that many eyes have seen many marvels—and that great marvels are still to be revealed.)

The next questions are: Are UFOs of terrestrial origin, and, if they are, who or what is putting them up there—and for what purpose? Or are they of celestial origin, and, if so, are they interplanetary, even possibly interstellar—and with what purpose?

My lifelong hobby of astronomy, together with what I consider to be overwhelming affirmative evidence, incline me toward the belief that UFOs are "real" and of celestial origin—interplanetary or interstellar.

In "The UFO Evidence," NICAP states, in judicious, conservative language, its "support of the hypothesis that UFOs are under intelligent control, making plausible the notion that some of them might be of extra-terrestrial origin."

NICAP also quotes, in the May-June 1966 issue of its publication, "The UFO Investigator," the stated position of one of the most highly qualified members of its Board of Governors, Joseph Bryan III (Colonel, USAF, Retired), former Special Assistant to the Secretary of the Air Force (1952-53) and former member of the staff of Gen. Lauris Norstad, then Supreme Allied Commander at NATO: "It is my opinion that the UFOs reported by witnesses under intelligent control; that

their speeds, maneuvers, and other technical evidence prove them superior to any aircraft or space devices now produced on earth; and that these UFOs are interplanetary devices systematically observing the earth, either manned or under remote control, or both."

Frank Edwards, an implacable Believer, quotes, in his "Flying Saucers—Serious Business," Dr. Walter Reidel, the German rocket expert ("I am convinced that saucers have an out-of-world basis") and Dr. Herman Oberth ("Flying saucers come from distant worlds").

But the battle lines remain drawn in the War of the Unbelievers and Believers. It is still a Donnybrook, with Armageddon not yet in sight.

Are flying saucers real or unreal, fact or fantasy?

As of now, I don't know.

And you don't know.

But one day we'll know.

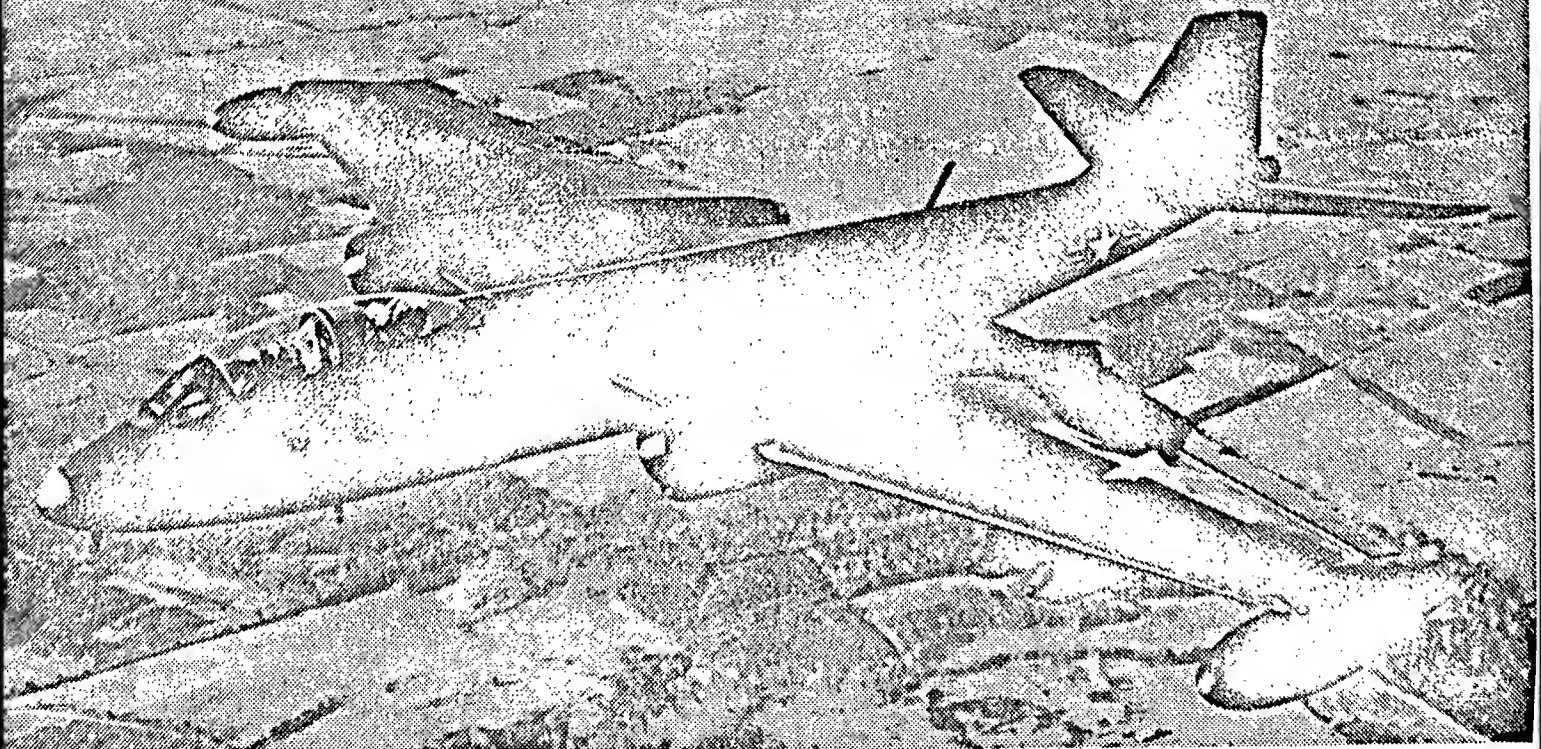
**INCIDENT AT EXETER:** The Story of Unidentified Flying Objects Over America Today. By John G. Fuller. G. P. Putnam's Sons. 251 pages. \$5.95.

**FLYING SAUCERS — SERIOUS BUSINESS.** By Frank Edwards. Lyle Stuart, Inc. 30 illustrations. 319 pages. \$5.95.

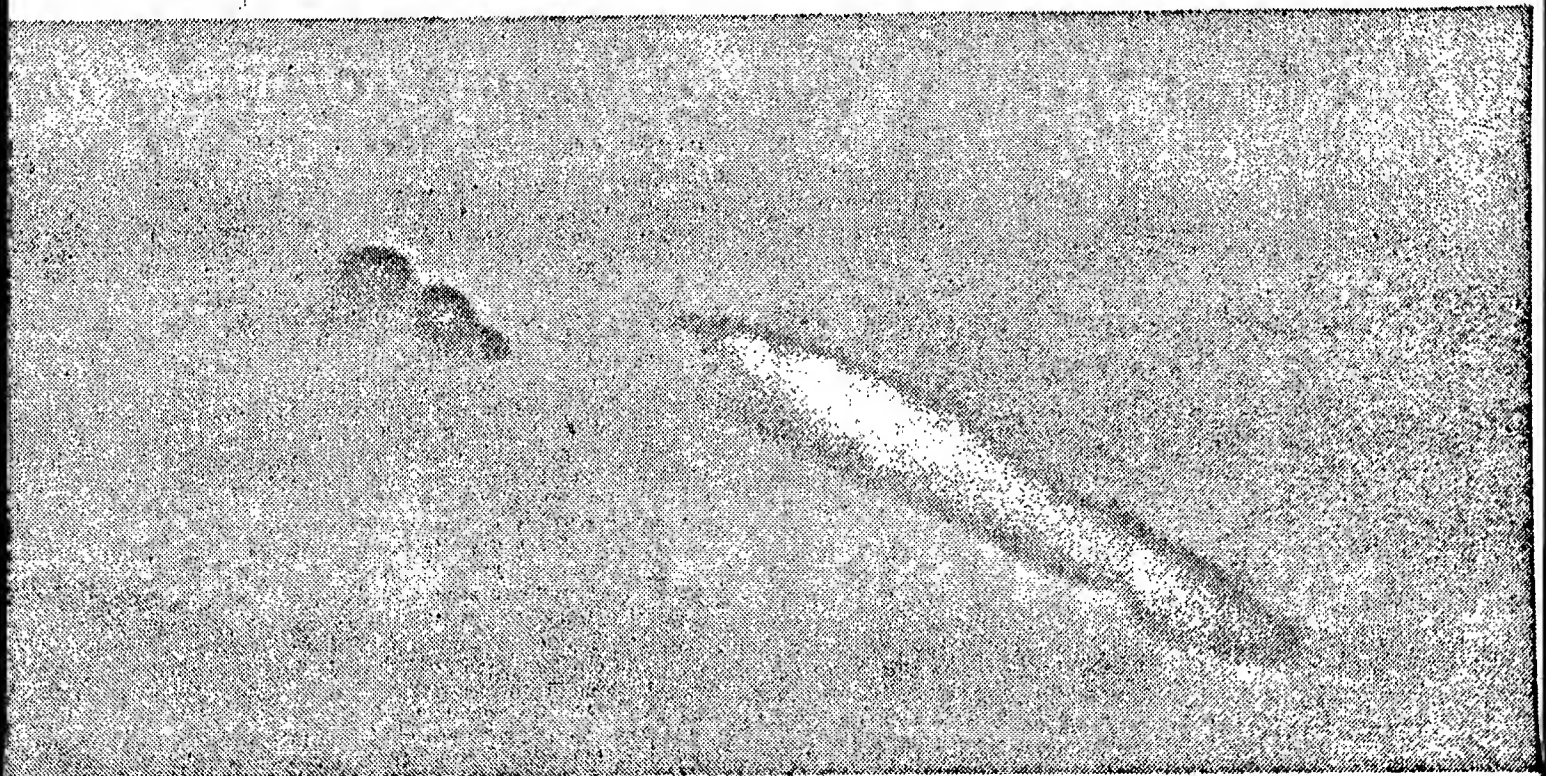
**THE UFO EVIDENCE:** Unidentified Flying Objects. Richard H. Hall, Editor. Published by The National Investigations Committee on Aerial Phenomena (NICAP), Washington, D.C. Drawings and charts. 164 pages. \$5.

**FLYING SAUCERS AND THE U.S. AIR FORCE:** The Official Air Force Story. By Lt. Col. Lawrence J. Tacker, U.S. Air Force. D. Van Nostrand Co. 10 illustrations. 164 pages. \$3.50.





Photograph of a U.S. B-57 bomber taken in September, 1957. Disc at upper right was not noted until after development of the negative.



Enlargement of the disc is shown above. Photos provided for publication by NICAP. (National Investigations Committee on Aerial Phenomena).

# Is There Possibly Anybody Out There? *Even a Couple of Optimists Skirt Fantasy in Their Case for the UFO*

By John Davy

London Observer

**L**ONDON—From time to time, a reader writes to me about my part in suppressing the truth about flying saucers. He is quite forbearing; he realizes, he says, that I am gagged by the authorities, who are fearful of the truth becoming known. For the fact of the matter is, he informs me, that an extraterrestrial civilization is making regular contact with this planet.

But now, thanks to a remarkable collaboration between an American and a Russian astronomer, I am ungagged. I can freely report some remarkable arguments contained in their book "Intelligent Life in the Universe," which is shortly to be published in the United States by Holden-Day Inc., San Francisco. They conclude that extraterrestrial civilizations are not only possible but probable, and that they may well have made, or are attempting to make, contact with us.

The American is Carl Sagan of Harvard University and the Smithsonian Astrophysical Observatory. The Russian is Academician Josef Shklovskii of the Sternberg Astronomical Institute. They have never met each other—they collaborated by mail. Nor have they met any representatives of extraterrestrial civilizations. Their cosmic excursion is propelled by careful scientific argument laced with a dash of speculation.

It is a heady mixture. For, as Sagan remarks in an introductory chapter, earthmen do not feel exactly detached

about extraterrestrial civilizations. Some yearn for them to exist. Others would prefer them not to. Sagan says that he and Shklovskii are "cautious optimists" on the question. Clearly they would rather like extraterrestrials to exist, and they have written almost 500 pages to show that they might.

Let us, then, follow some of their arguments, first tightly fastening our intellectual and emotional seat belts.

## Our Impossible Sphere

**A** QUICK LOOK at the other planets of our solar system seems to reveal a poor prospect for life. Mercury and Venus appear too hot, Mars has almost no air, Jupiter and Saturn seem to be swathed in ammonia and methane. But can life exist on earth?

A Martian astronomer would see a planet surrounded by a deadly gas, namely oxygen. It is well known that this very reactive element readily combines with almost anything, including the unstable compounds of hydrogen, carbon and nitrogen, out of which living organisms are built. All signs of life on earth must surely be quickly oxidized to dust and ashes. (Only earthmen know the remarkable methods developed by our bodies for coping with oxygen so that it does not burn us up.)

Martian satellites dispatched to photograph the surface from a couple of hundred miles up (as the Tiros and Nimbus weather satellites have done) would reveal no conclusive signs of life.

Arguments from one's own planetary

experience are thus tricky. Nevertheless, Sagan and Shklovskii conclude that "habitable" planets could well be common in the universe. The emphasis is on "could," since there is no direct evidence. The largest earth-based telescope could not reveal a planet of another star.

## Indirect Evidence

**T**HE INDIRECT evidence is of three kinds:

1. There are many twin stars orbiting each other in the sky; many stars could have orbiting planets instead of an orbiting star-twin.

2. An astronomer at Sproul Observatory, Swarthmore College, Peter van de Kamp, recorded the position of Barnard's star in the constellation of Cygnus for 25 years and detected a small pendulum motion. This, he calculated, could be caused by a "dark companion"—a planet about twice the size of Jupiter orbiting the star once every 24 earth-years and affecting its motion. If he is right, this is the only planet detected outside our solar system.

3. Statistical arguments: there are 150 billion stars in our galaxy alone, a considerable proportion of which are similar to our sun. It is highly probable that there are billions of planetary systems similar to ours in our galaxy.

This leads Sagan and Shklovskii to conclude that our galaxy may contain at least one billion habitable planets. The nearest promising stars, they say, are Epsilon Eridani, Epsilon Indi and

Tau Ceti. These are 10.3, 11.3 and 12.2 light years away respectively.

The next questions that these intrepid cosmic thinkers tackle are: How many of these hypothetical planets are likely to contain life? And how many might contain "advanced technical civilizations"?

In recent years, a number of researchers have been releasing electric sparks—miniature bolts of lightning—through mixtures of gases and vapors (water, ammonia, hydrogen, methane) which are thought to represent primitive planetary atmospheres. They have been gratified to discover in the resulting mixtures a huge variety of complex organic substances like sugar, amino acids, urea and others associated with life.

The next step is to arrange for a complex molecule to reproduce itself. This, too, has been done in the test tube, producing a simple form of nucleic acid, the genetic material that controls heredity.

But there is a slight embarrassment: the reaction only works in the presence of an enzyme derived from a living organism. The enzyme is a protein—yet the synthesis of proteins is controlled by nucleic acids.

If it needs a protein to make a nucleic acid, and it needs a nucleic acid to make a protein, then the prospects of life in the primitive planetary soup would be poor. So we must assume, say Sagan and Shklovskii, that some nucleic acids are formed "spontaneously."

Thus, in principle (Sagan and Shklovskii say), life on earthlike planets may be the rule rather than the exception. In practice, we can't do much more than guess.

### A Tropical Mars?

**H**OWEVER, there is circumstantial evidence of biological processes on Mars: the "waves of darkening" in spring and summer near the receding ice caps; spectroscopic evidence that dark areas include organic molecules; the curious fact that the red deserts appear to consist of an iron-rich compound containing much water and oxygen, normally found in the soils of hot, humid regions. Perhaps Mars was lushly tropical in the distant past?

Venus is covered in clouds and the nature of its surface is thus speculative, but Sagan's guess is that it is "very like hell," with rocks glowing dull red in fierce heat trapped by the clouds above. Other theories propose an oily smog-like atmosphere, or oceans of soda water. Up in the clouds, it would be cooler—suitable, possibly, for the evolution of aerial organisms of some kind.

Jupiter appears to have a primitive planetary atmosphere full of hydrogen, methane, ammonia, water and possibly frequent bolts of lightning—a promising scene for some "prebiology," or for bizarre biological surprises.

The other planets seem poor life prospects in terms of earth-type life. Nevertheless, as a planetary system, we have at least one planet with life, one

which quite possibly has life now and may have had more in the past (Mars) plus two possibly "prebiological" planets (Jupiter and Venus). Thus if the galaxy contains one billion potentially "habitable" planets, the total actually inhabited by something could be very large indeed.

### A Half-Mile Eye

**W**HAT ARE the chances of "intelligent" inhabitants on other planets? Human intelligence has evolved, as has human anatomy, hand-in-hand with the terrestrial environment. But, bizarre planets might produce bizarre anatomy and physiology.

A planet with a turbid atmosphere, transparent only to radio waves, might produce organisms with radio eyes. But a radio eyeball, says Sagan, would have to be half a mile in diameter to be as efficient as a light eyeball. To understand such a structure, let alone decide whether it belonged to an "intelligence," would be a baffling problem for visiting earthmen.

By the same argument, however, earthlike planets would seem likely to have earthlike inhabitants, and it is a reasonable hypothesis that a proportion of these have produced technical civilizations.

Our own technical civilization has existed for a very short time on the cosmic time scale. Thus, if we are not unique, there should be many technical civilizations which are much older.

Suppose one of these was disposed to see PLANETS, Page E4, Column 1



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direct its skills to cosmic exploration. Interstellar communication, let alone interstellar travel, sounds a desperately laborious business.

Suppose that Epsilon Eridani boasts a civilized planet interested in communicating with us. Assume, too, that the technical difficulties (which are formidable) are overcome. It would take over ten years for a message to travel to earth, another ten for us to answer back. To get some sense into the exchange would presuppose a mutually comprehensible code.

An American radio astronomer, Frank Drake, recently fabricated an "interstellar message" of 550 dots and dashes and asked distinguished scientists to decode it. They had very moderate success, although they knew the decoded result would be pictorial and that the code derived from a human mind (i.e. Drake's).

But even the "cautious optimism" of Sagan and Shklovskii recognizes that there is only a slight chance that the nearest likely stars actually have planets with technical civilizations endeavoring to contact others on the 21-centimeter radio band. Some rough statistics suggest that the nearest advanced technical civilization in the galaxy would be likely to lie from a hundred to a thousand light years away. Thus the minimum time for an exchange of messages would be two centuries. One of the first qualities necessary for cosmic communication will be remarkable patience.

This applies still more to interstellar travel despite the bonus of

"time-contraction," a consequence of relativity. The time effect presupposes a spacecraft which can travel near the speed of light; a crew could then make a round trip to the center of the galaxy in 42 years. But on arrival back home, they would find that tens of thousands of years had elapsed. There would be no guarantee that anyone would be there to welcome them.

#### Millennial Visits

**D**ESPITE THESE discouraging prospects, the optimism of Sagan and Shklovskii seems to increase as their book proceeds. Suppose, says Sagan, a million civilizations, mostly well in advance of our own, are currently engaged in plying the galaxy at relativistic speeds. Suppose, too, that each dispatches one starship per year and that these concentrate on likely planets; any particular planet similar to ours might be visited once every thousand years. ("In my opinion," Shklovskii writes in parenthesis, "these estimates of Sagan are slightly too optimistic.")

Have we been or are we being visited? A Russian ethnologist, M. M. Agrest, has conjectured that Sodom and Gomorrah were destroyed by a nuclear explosion (presumably engineered by extraterrestrials). A fresco in a Saharan cliff was held by some to represent a Martian in a space suit, although it is more conventionally regarded as a human in a ritual mask and costume.

Sagan is more impressed by a legend about the origin of Sumerian civilization, which, according to the account

of Alexander Polyhistor, derived from "an animal endowed with reason who was called Oannes . . . This Being in the daytime used to converse with men, but took no food at that season; and he gave them an insight into letters, and sciences, and every kind of art. He taught them to construct houses, to found temples, to compile laws, and explained to them the principles of geometric knowledge. . . ."

The gods of the Sumerians, says Sagan, were each associated with a different star, and there survive seals depicting sunlike objects surrounded by various numbers of planets. "Such a picture," writes Sagan, "is not altogether different from what we might expect if a network of confederated civilizations interlaced the galaxy."

#### Audible Heartbeats

**S**AGAN AND Shklovskii are both aware of the vague borderline that separates bold scientific speculation from fantasy or wishful thinking. They quote an old Chinese proverb: "The man who eagerly awaits the arrival of a friend should not mistake the beating of his own heart for the thumping hooves of the approaching horse." Nevertheless, the beating of both their hearts, it seems to me, is distinctly audible in their arguments—and why not?

Not long ago, it was rather fashionable to proclaim man's "insignificance" and "loneliness" in a vast empty universe. Perhaps this loneliness is becoming oppressive, or the possibility of self-destruction too menacing.

However this may be, there seem to be increasing numbers of scientists prepared to populate the universe—very speculatively and cautiously—with superior intelligences, hopefully benevolent, possibly menacing, but differing mainly from their Sumerian predecessors in being subject to 20th century laws of physics and chemistry.

I would have liked to have seen this book completed with what is a still more intriguing line of thought. Physics and chemistry, and our view of the universe, have emerged as the result of a mode of thinking and a direction of interests which are historically very new. Is there any reason to suppose they are final?

Suppose that human consciousness is engaged in a slow evolution. We may—as Sagan and Shklovskii themselves recognize—come to look back on their view of the universe as a quaint historical curiosity. Interest and awareness may have moved on to quite different kinds of experience.

There is a very real sense in which the vast and awe-inspiring universe in which we live is the product of our own explicitly 20th century minds. We have never *seen* it; it is a great feat of imagination which is then incorporated into the apparatus and experiments which confirm—with the help of a long chain of inference—our imaginings. But the future could bring new imaginations. These would direct our attention to new phenomena, suggest quite different experiments, and could lead to quite new perspectives.



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